

Black Belt Team to Systemize Problem-Solving Techniques

Kevin M. Toolan

"The Six Black Belts" is not the title of a new karate-themed action movie. Instead, it is the number of Tobyhanna Army Depot, PA, personnel learning and helping to apply Six Sigma techniques to reduce defects and improve processes in shops and offices across the depot. Six Sigma is a disciplined, process-focused methodology that complements the depot's existing Lean initiatives. "It incorporates a customer-focused philosophy, statistical measures of process quality and defined problem-solving techniques," explained Jim Bochicchio, one of the six engineers moving toward Six Sigma black belt certification.

Lean/Six Sigma (LSS) process improvements are helping technicians and engineers reduce product defects and dramatically improve efficiencies and procedures. Here, Lawrence Plunkett calibrates a piece of equipment used to test thermal night vision sights. (U.S. Army photo.)



Therese Paxton, Firefinder Division Electronics Mechanic, Intelligence, Surveillance and Reconnaissance Directorate, wires a phase shifter as Jennifer Godusky observes. Godusky is one of six Tobyhanna Army Depot engineers completing LSS black belt training. (U.S. Army photo by Anthony Medici.)

Joining Bochicchio are Don Engel, Jennifer Godusky, James Waters and Mark Viola, who are training through the Northeastern Pennsylvania Industrial Resource Center, and Bob Young, who is receiving Master Black Belt Training through a U.S. Army Materiel Command (AMC) program.

“Our continuous improvement process is LSS, which capitalizes on the strengths and synergy of both methodologies,” remarked Robert Katulka, Director of Productivity Improvement and Innovation. “Lean looks to remove non-value-added steps from processes, while Six Sigma is used for detailed analysis and to identify root causes of process variability.”

Sigma is a statistical measure of dispersion — or variability — in a process. Six Sigma is a measure of an extremely

low percentage — 0.00034 percent — of defects. As variability declines, so do defects, and the depot is better able to meet customers’ expectations.

The black belts work with subject matter expert (SME) teams to address process and defect issues. Black belts bring their analytical training to the teams, while SMEs bring technical experience and training to the project. The process typically includes creating a process map, collecting data and using Six Sigma statistical tools to analyze the data and develop solutions through a collaborative team effort. As part of the black belt training and certification process, each black belt works with technicians and other personnel on projects that reduce defects and variables and improve quality.

Six Sigma is a disciplined, process-focused methodology that complements the depot’s existing Lean initiatives. It incorporates a customer-focused philosophy, statistical measures of process quality and defined problem-solving techniques.

of the Q36 antenna,” says Joe McCafferty, Chief of Firefinder Components Division. “We’ve addressed problems with spacers, the linear array, antenna re-facing and phase shifters as causes of failures that were occurring.”

One of Godusky’s projects evaluated antenna test and repair on the AN/TPQ-36 Firefinder System. Working with shop personnel, the black belt team implemented a standardized test and repair procedure that has improved process yields from 12 to 54 percent in the near field probe. Yield is defined as a percentage of met commitments (total of defect-free events) over the total number of opportunities.

“Six Sigma data collection and analysis helped us find several process improvements in the repair



Mark Cooper inserts a microprocessor chip into the mother board of an Itronix® laptop computer at Tobyhanna Army Depot. Tobyhanna and 30 Forward Repair Activities worldwide now repair computers under a manufacturers’ warranty repair program. (U.S. Army photo.)

Engel’s team is working on reducing Line Replaceable Unit (LRU) failures in AN/TRC-170 shelters. The team developed a data sheet to capture failures. The team then analyzed the data and identified those LRUs with the highest failure rates and technicians were interviewed to determine possible causes for the failures. The project goal is to reduce the failure rate by 50 percent, which would also reduce the shelter’s repair cycle time.



Don Engel (standing) collects data as Pete MacKarey, Communications Division Electronics Mechanic, Communications Systems Directorate, performs an azimuth and elevation adjustment on an AN/TRC-170 V3 alarm monitor. Engel is completing his black belt training and certification under a collaborative program sponsored by AMC. (U.S. Army photo by Anthony Medici.)



Bruce Telincho, Tobyhanna Army Depot, tests a telephone circuit switch power supply component to be issued in AN/TTC-46/47 Mobile Subscriber Equipment. LSS standardized test and repair procedures have improved process yields at Tobyhanna from 12 to 54 percent. (U.S. Army photo by Anthony Ricchiazzi.)

The investigation has resulted in the use of a mock-up shelter to test selected components, development of a course to train personnel on troubleshooting high-power amplifiers and other improvements. Data collection and analysis are continuing. Initial results are promising, with significant failure reductions in both the receiving and transmitting modems.

Bochicchio worked with a team looking at production order errors as they impacted workload in the Tactical Radio Branch. At the time, there was no clear process to adjust workload requirements for radios that are part of other systems repaired in other cost centers. As a result of the Six Sigma analysis, a new process was established that more clearly defines available workload and increases the branch's capacity by half a work year. It couldn't have been done as effectively without the Six Sigma techniques Bochicchio is learning. "Staying focused on the data gets us to the root cause, and the 'improve' and 'control' phases ensure that the improvements are valid," he noted.

Tobyhanna Army Depot is DOD's largest center for the repair, overhaul and fabrication of numerous electronics systems and components — from tactical field radios to the ground terminals for the defense satellite communications network.

Viola, Chief of the Process Engineering Division, will work to reduce administrative errors on documentation moving between the depot and the Defense Distribution Depot Tobyhanna. The project is in its initial stages. Viola likes the reliability of Six Sigma problem-solving techniques. "It's not uncommon to just take a stab in the dark to solve a process variation. Six Sigma offers a systematic approach to identifying the root cause of the problem and leads to more reliable improvements."

One of Waters' teams is looking at warranty returns on the RT-859A component of the AN/APX-72 Identification Friend or Foe Transponders. Following data collection and analysis, the team is moving to the project's improvement phase, which may include using alternate packing material and determining if warning labels should be attached to shipping containers.

As a master black belt, Young received the same training as his five peers. His

training through AMC adds creative problem solving, ISO 9000 lead auditor certification, ethics, psychometric measures and instructor certification. As a master black belt, Young will travel frequently to instruct various aspects of Six Sigma processes to work-force personnel.

The black belts' initial projects are part of their training and certification process that started in October 2004. As they complete their certification, black belts will begin to apply their Six Sigma expertise on new projects across the depot.

Tobyhanna Army Depot is DOD's largest center for the repair, overhaul and fabrication of numerous electronics systems and components — from tactical field radios to the ground terminals for the defense satellite communications network. Tobyhanna's missions support all branches of the military.

About 4,400 personnel are employed at Tobyhanna, which is in the Pocono Mountains of northeastern Pennsylvania. Tobyhanna Army Depot is part of the Communications-Electronics Life Cycle Management Command (CELCMC). Headquartered at Fort Monmouth, NJ, CELCMC's mission is to research, develop, acquire, field and sustain command, control, communications, computer, intelligence, electronic warfare and sensors capabilities for the military.

KEVIN M. TOOLAN is the Public Affairs Officer at Tobyhanna Army Depot. He has a B.A. in English from St. Bonaventure University and is a Defense Information School graduate. Toolan has more than 28 years of Army public affairs experience.